

ROCKY FLATS PLANT
GOLDEN, COLORADO

TECHNICAL REVIEW OF THE DRAFT
PROPOSED SUBSURFACE INTERIM MEASURES/INTERIM
REMEDIAL ACTION PLAN/ENVIRONMENTAL ASSESSMENT AND
DECISION DOCUMENT

Prepared for

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1.0 INTRODUCTION

PRC Environmental Management, Inc (PRC) prepared this report for the U S Environmental Protection Agency (EPA) under contract number 68-W9-0009, Technical Enforcement Support (TES) 12, work assignment number C08055 This report consists of a technical review of the Draft Proposed Subsurface Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document (IM/IRAP) for Operable Unit 2 (OU2) at the Rocky Flats Plant (RFP) This IM/IRAP was prepared by the U S Department of Energy (DOE) in March 1992

The following technical review comments have been divided into two categories general and specific General comments pertain to the document as a whole, whereas specific comments correspond to statements in the text by page and section number

2.0 GENERAL COMMENTS

The following comments address the general presentation of information in this report and information that was not included in the IM/IRAP

- 1 Before conducting in situ pilot-scale testing for vacuum vapor extraction to treat residual free-phase dense nonaqueous phase liquids (DNAPL) contamination, further data should be gathered on the DNAPL and the environmental conditions These data should include information on characteristics of the unsaturated zone soil, the underlying claystone or sandstone bedrock, and the DNAPL Soil and bedrock characteristics that should be evaluated include permeability, porosity, moisture, structure, organic carbon content, and particle size distribution Characteristics of the DNAPL that should be assessed include the vapor pressure, Henry's law constant, solubility, adsorption equilibrium, density, and viscosity These data will enable more effective design of the vacuum vapor extraction test
- 2 The document does not indicate that a soil vapor survey has been conducted at OU2 Such an investigation could be used to delineate vapor concentrations as a function of depth to locate

the contaminant source in the subsurface and to aid in designing the soil vapor extraction system

- 3 Conceptual hydrogeologic models and cross-sections were created from the geologic logs of boreholes drilled near each of the three test areas. However, the conceptual models do not match the representative geologic logs contained in Appendix D. This mismatch of the subsurface conceptual model to supporting geologic logs is particularly disturbing because DOE has adopted an observational streamlined approach to plan this subsurface IM/IRA for OU2. That is, DOE has acknowledged that the subsurface at OU2 has not been fully characterized, but intends to use all available data to develop a model of the expected or probable conditions. However, the available data from geologic logs are not consistent with the developed models. Because the extraction systems designed for each area were based on these apparently incorrect conceptual models, there is some concern that the systems will not be effective in removing the volatile organic compound (VOC) contamination.

It is suggested that all available data be collected and reanalyzed. New subsurface conceptual models should then be created to accurately reflect the collected data, and all important supporting data should be included in the appendices. Additionally, new figures should be created to accurately illustrate the locations of all boreholes and monitoring wells drilled near the three areas of interest. As currently presented, there does not appear to be enough information to support designing recovery systems at any of three chosen OU2 sites. See specific comments for more detail on the inconsistencies in this report.

- 4 This IM/IRAP identifies Colorado water quality standards as to be considered (TBC) values for discharges of treated ground water. The rationale for considering TBC values as something other than applicable or relevant and appropriate requirements (ARARs) should be provided. Standards have been promulgated by the state of Colorado for both Walnut and Woman Creeks and their tributaries, surface water discharges to either drainage must comply with the standards established for that drainage.

3 0 SPECIFIC COMMENTS

The following comments address specific inconsistencies and technical inadequacies of the report

Comment 1 Page 1-1, Section 3.1 The primary objective for the IM/TRAP is "to provide information that will aid in the selection and design of final remedial actions at OU2 for the removal of free-phase volatile organic compound (VOC) contamination " Yet, it is known that the site is contaminated with substances other than VOCs, including metals and radionuclides. The primary objective should be restated to include gathering information on remediation of metals and radionuclides

Rationale Information should be collected on a technology's effectiveness on all contaminants at OU2, and should not be limited to VOCs

Comment 2 Page 2-26, Paragraph 2, Section 2.2.5 The text cites DOE's 1980 environmental impact statement (DOE, 1980) for support of a statement that no vegetative stresses attributable to hazardous waste contamination have been identified on RFP. Results of more recent studies should be used to describe current conditions at RFP

Rationale A discussion of current biological conditions should be based on relatively recent information. It is not clear that studies leading to the 1980 DOE report were designed to identify stress from hazardous wastes or were meant to serve another purpose. Recent ecological studies as part of remedial investigations at the site would provide more recent and appropriate information

Comment 3 Page 2-27, Paragraph 1, Section 2.2.5 The text describes common birds of prey in the area based on the 1980 DOE environmental impact statement (DOE, 1980). Many of these species are no longer considered common. The text should be revised based on relevant, recent data

- Rationale Again, the use of 12-year-old data is inappropriate to describe current ecological conditions In this case particularly, ferruginous and Swainson's hawks are no longer considered common
- Comment 4 Page 2-29, Paragraph 2, Section 2.2.7 The list of Clean Water Act provisions identified for protection of wetlands is not complete The list should either be complete or refer only to the act generally
- Rationale The identification of only a partial list of applicable laws as the controllers of relevant issues may lead to an incomplete evaluation of the resource
- Comment 5 Page 4-5, Section 4.1 The discussion on the possible use of in situ bioremediation considers only the remediation of halogenated organic compounds DOE should address the effect of radionuclides on microorganisms
- Rationale All factors that may affect the effectiveness of a remedial technology should be discussed in the evaluation
- Comment 6 Page 4-10, Section 4.2.3.1 This section discusses the off-gas treatment for the vapor stream collected from the vapor extraction system High-efficiency particulate air (HEPA) filters and a granular activated carbon (GAC) adsorption unit will treat the vapor stream However, the effect of the HEPA filters on VOC contaminants in the vapor is unknown DOE should discuss any problems related to using HEPA filters on VOCs
- Rationale The off-gas treatment system should be thoroughly evaluated for possible problems
- Comment 7 Page 4-10, Paragraph 3, Section 4.2.3.1 The text states that greater than expected air releases will be controlled by the project-specific health and safety plan and the plan for prevention of contaminant dispersion The ways these documents would control a release is not clear Identification of a greater than expected release will

most likely be after the fact The IM/IRAP should explain how the plans will control air releases

Rationale The plan does not distinguish between control of the release and control of the effect of the release

Comment 8 Page 4-15, Paragraph 1, Section 4.2.3.4 The statement that further consideration of impacts to threatened and endangered species for the OU2 IM/IRAP is not warranted does not agree with the statement on page 2-28 that focused surveys of potentially suitable habitat will be undertaken to determine whether sensitive wildlife species are present The text should be clarified Because there appears to be some question whether all habitat for sensitive or special status species has been evaluated, the assertion that further efforts are not warranted should be eliminated

Rationale One of the major ecological issues associated with the site is its possible use by special status species The assertion of inadequate information in one section of the IM/IRAP does not correlate with the determination that no further consideration is warranted in another section of the IM/IRAP

Comment 9 Page 4-24, Section 4.3 1.1, Figure 4-1 The text and the figure state that the proposed testing site is in the north-central portion of the spill area A rationale should be provided for this proposed test area as a more suitable area would seem to be center of the spill area illustrated in Figure 4-1

Rationale The area of proposed testing should be justified

Comment 10 Page 4-24, Section 4 3 1 2 and Appendix D This section states that borehole (BH) 1687, which was used to represent the stratigraphy of the 903 pad, is shown on Figure 2-9 BH1687 is not illustrated on this figure In addition, this section describes the stratigraphy of the area based on the log of BH1687 However, the written description and the log of the borehole do not match The text states that the

alluvium extends to 18 feet below ground surface (bgs), whereas the log illustrates alluvium to 22 feet bgs. It should also be noted that the log indicates that no sample was recovered from the interval 11 to 20 feet. The text should be corrected to accurately reflect the geologic log. In addition, Figures 4-2 and 4-4 should also be corrected to reflect the correct depth to bedrock (22 feet) at the 903 pad area.

Rationale The text should accurately reflect the subsurface geology described on the geologic logs.

Comment 11 Page 4-32, First Paragraph, Third Sentence This sentence describes the installation of a steel surface casing to bedrock in deep vapor extraction wells, while Figure 4-5 illustrates polyvinyl chloride (PVC) casing. The type of casing illustrated in the figure should be the same as the type of casing described in the text. This discrepancy should be corrected.

Rationale Consistency among the text and supporting figures promotes clarity.

Comment 12 Page 4-40, Section 4.3.2.1 This section discusses the use of a heated holding tank for storage of 903 pad ground water and condensate. The text does not mention the requirement for secondary containment of this holding tank for potentially hazardous waste. The text should discuss the secondary containment requirements for this holding tank and explain how they will be met.

Rationale The Resource Conservation and Recovery Act (RCRA) requires secondary containment for hazardous waste tank storage units.

Comment 13 Page 4-45, Section 4.3.3.2 Vacuum extraction has demonstrated effectiveness on soils with permeabilities of 10^{-4} to 10^{-8} centimeters per second. This section of the report does not provide values for permeabilities of the soils at OU2. This information can be found in documents such as "Hydrogeological Characterizations of

the Rocky Flats Plant" (Hydro-Search, 1985) The report should contain permeability values to demonstrate the feasibility of vacuum extraction

Rationale The viability of a potential remedial technology should be justified with quantifiable parameters

Comment 14 Page 4-45, Section 4.3.3.2, Seventh Sentence According to this sentence, "Both sandstone and claystone bedrock is expected to have relatively low permeabilities when compared with the alluvium, however, bedrock permeability is expected to be high enough to permit a measurable vapor flow rate " This statement does not indicate whether a measurable air flow rate is sufficient to support the flow required by a vacuum vapor extraction system The permeability of the sandstone and claystone should be defined more exactly and the text should be modified to describe the specific requirements of the vacuum vapor extraction system

Rationale Presentation of complete environmental data promotes effective evaluation of technologies and prevents unnecessary expense and use of resources

Comment 15 Page 4-50, Section 4.4.1.2 and Figure 2-9 Borehole 2087 is not illustrated on Figure 2-9, as stated in this section BH2087 should be added to Figure 2-9

Rationale The text and figures should be consistent

Comment 16 Page 4-52, Section 4.4.1.2, Second Paragraph According to this paragraph, the sample from well 0174 collected in 1987 had a perchloroethylene (PCE) concentration greater than the solubility limit Concentrations of PCE in other samples collected from this well exceed 5 percent to 10 percent of the solubility limit These levels of DNAPL constituents can indicate the presence of an immiscible phase Before implementing vacuum vapor extraction, the ground water in the area of well 0174 should be evaluated to determine whether there is an immiscible phase, using an interface probe or a bottom-loading clear teflon bailer

Rationale Complete evaluation of existing data and further investigation in areas of concern promotes the effective evaluation of treatment technologies

Comment 17 Page 4-60, Section 4.5.1.2, First Paragraph This paragraph states that two boreholes (which were converted to monitoring wells) BH3587 and BH3687, were drilled north of the east trenches area, as shown on Figure 2-13. However, only BH3587 is illustrated on Figure 2-13. In addition, Figure 2-9 illustrates BH3587 and BH3687 in the mound area rather than north of the east trenches area. The text and figures should be revised to correctly depict the location of boreholes and monitoring wells drilled in the OU2 area.

Rationale The tables and text should be consistent and accurate.

Comment 18 Page 4-61, Section 4.5.1.2, Second Paragraph and Appendix D The description of the log for BH3687 on page 4-61 does not match the log presented in Appendix D. The text states that the alluvium extends to approximately 11 feet bgs, whereas the log illustrates alluvium to approximately 7.5 feet bgs. In addition, the text describes an 11-foot interval of sandy claystone underlying the alluvium, whereas the log describes this layer of claystone as silty with caliche. Lastly, the text states that sandstone underlies the claystone and extends to a depth of at least 75 feet bgs, whereas the log illustrates that the sandstone extends to a depth of only 45 feet bgs. The text should be modified to correctly represent the attached borehole log.

The last sentence of this paragraph states that claystone underlies the alluvium south of the east trenches and that sandstone underlies the alluvium west of the east trenches. Because only one geologic log of the east trenches area was provided, there is no way to determine the validity of this statement. Additional geologic logs should be provided for review.

Rationale The geologic logs should support the description of the subsurface geology in the east trenches area.

4 0 REFERENCES

DOE, 1980 Final Environmental Impact Statement, Rocky Flats Plant, Golden, CO, April 1980

Hydro-Search, 1985 Hydrogeological Characterization of The Rocky Flats Plant